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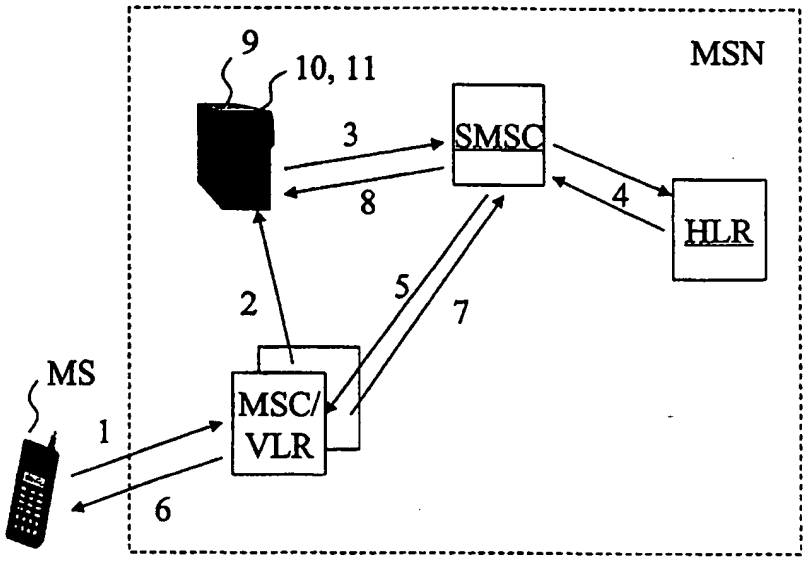

(57) Abstract

Procedure and system for sending short messages to a mobile subscriber on the basis of the location of the mobile station (MS). In the procedure, the location of the mobile station is monitored on the basis of the information in the visitor location register (VLR) and, when it is detected that the mobile station is moving to a foreign country, a short message containing information about the activities and services of the foreign operator is sent to the mobile station. The invention makes it possible to automate the transmission of information, thus improving the services provided for foreign mobile subscribers.

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PROCEDURE AND SYSTEM FOR SENDING A SHORT MESSAGE TO A SUBSCRIBER IN A MOBILE COMMUNICATION NETWORK

The present invention relates to a procedure as defined in the preamble of claim 1 and to system as defined in the preamble of claim 9 for sending a short message to a subscriber in a mobile communication network on the basis of the location of the mobile station.

At present, short messages can be sent in a mobile communication network. A short message (SMS, Short Message Service) is a message in text form, which may have a length of e.g. 160 characters and which can be sent by a mobile subscriber to another mobile subscriber. In practice, to send a short message, the message to be sent is typed on a mobile station and sent to another mobile subscriber via a short-message service centre connected to the mobile communication network. The transmission of short messages is a standardised feature of the mobile communication network. Another possibility is that a short message is generated in the mobile communication network, e.g. on the basis of a telephone message received by the mobile subscriber's answering service. In this case, the message is generated automatically on the basis of predetermined information and events.

In prior art, no method or system is known that could be used to transmit predetermined short messages to a mobile subscriber on the basis of location. Such messages could be used to inform the mobile subscriber about services and special arrangements provided by the operator or applying in the location area.

The object of the present invention is to improve the state of the art in regard of transmission of predetermined short messages. A specific object of the present invention is to disclose a new procedure an system which can be effectively utilised by an op-

erator to provide desired information for its customers.

As for the features characteristic of the invention, reference is made to the claims.

In the procedure of the invention for sending a short message to a mobile subscriber on the basis of the location of the mobile station, the location of the mobile station is monitored on the basis of information obtained from a visitor location register (VLR). The information is preferably collected in a single application server and, according to the invention, when it is detected that the mobile station is moving into a specified area, a short message is sent to the mobile station to transmit desired information about the mobile communication network to the mobile subscriber. The specified area may be one defined by the mobile subscriber him/herself, or the area may comprise areas outside the subscriber's home country, i.e. when the subscriber is in a foreign country.

Thanks to the invention, the operator can by simple means implement a service that it can utilise to increase the number of calls made. In addition, the operator will be able to automatically provide interesting information about the network and the services available in it, for its customers at home and abroad.

The invention can be easily implemented, so it is advantageous to implement and requires no large extra investments.

In a preferred embodiment of the invention, registration of foreign subscribers in particular is monitored in the visitor location register on the basis of the international mobile subscriber identity (IMSI) and/or mobile station ISDN (MSISDN). When the system detects that a new foreign subscriber is registered in the visitor location register, information about the new subscriber is sent to an application server, which sends a predetermined short message to

the new foreign subscriber. The short message may contain a greeting and e.g. the telephone number of the international number service of the subscriber's own operator. This has the effect that the subscriber immediately gets a positive idea of the operator which sent the message, thus improving the operator's customer service.

In an embodiment of the invention, a notice about successful transmission of a short message is sent to the application server. In the application server, information regarding transmitted and successful short messages is stored, and based on this information, the system can be prevented from sending new short messages during a predetermined period of time. This feature makes it possible to avoid sending foreign subscribers a new greeting or other informative short message each time the subscriber is registered in the visitor location register. The predetermined period of time may be e.g. two weeks or one month.

In another preferred embodiment of the present invention, the registering of foreign mobile stations in the visitor location register is monitored and, if it is detected that a mobile station has not been registered during the predetermined period of time, the data preventing transmission of new short messages is deleted from the application server. This feature is especially useful when a mobile subscriber often visits the country and the operator wants to send the subscriber a new greeting message every time the latter enters into the operator's territory. The predetermined period can be defined statistically by observing the way mobile subscribers use their mobile stations while abroad. For example, if a mobile station is not registered in the visitor location register for a week, it can well be assumed that after a week when the mobile subscriber is registered next,

he/she will already have gone back home and returned again to the operator's territory.

Moreover, in a preferred embodiment of the invention, a second short message complementing the information given in the first short message can be sent after a given time interval. The new message may contain information about the services provided by the operator.

In a preferred embodiment of the invention, the first short message can be sent to the mobile station when it is registered in its home network. This provides a handy way to wish the mobile subscriber welcome in his/her home country and his/her own operator's territory. The information contained in the short message can also be generated on the basis of the mobile station identity data. In a preferred case, the identity data could be used to determine the mobile subscriber's native language, so the message could be generated in that language. This is another improvement of the service provided by the operator for its customers.

The system of the invention for sending a short message to a mobile subscriber on the basis of the location of the mobile station comprises means for monitoring the location of the mobile station on the basis of information stored in a visitor location register. According to the invention, the system comprises an application server connected to the mobile communication network, the roaming information of the visitor location register for the mobile station being stored in said application server. Moreover, the application server is used to transmit short messages when predetermined conditions regarding the mobile subscriber are fulfilled.

In a preferred embodiment of the invention, the application server comprises means for the storage of subscriber-specific information. This information

can be utilised in sending short messages and setting various conditions to prevent messages from being sent. Moreover, the application server preferably comprises means for controlling the number of repetitions of short messages and their repetition intervals.

As for the advantages of the system of the invention, reference is made to the advantages of the procedure of the invention presented above.

In the following, the invention will be described by the aid of a preferred embodiment with reference to the attached drawing, which presents a diagram representing a preferred system according to the invention and a preferred example of signalling between the various components.

The drawing presents a diagrammatic illustration of a system according to the invention, comprising a mobile communication network MSN and a mobile station MS connected to it. The mobile communication network MSN comprises a short-message service centre SMSC, which is connected to a mobile services switching centre MSC, a visitor location register VLR and a home location register HLR. An application server 9 is connected to the short-message service centre SMSC and to the mobile services switching centre MSC. The application server comprises means 10 for the storage of subscriber-specific information and means 11 for controlling the number of repetitions of messages and their repetition intervals. The means 10 for the storage of subscriber-specific information and the means 11 for the control of short messages are implemented using program blocks and storage devices e.g. by means of a computer. The application server 9 can also be implemented using a computer.

Referring to the drawing, a preferred embodiment will now be described as an example of the operation of the system of the invention. In this example,

a mobile subscriber MS has come from abroad and roams into the operator's network, arrow 1. The subscriber information is obtained from the home location register (HLR) (not shown in the drawing) of the subscriber's home network in accordance with the normal roaming system of the mobile communication network. The operator's mobile services switching centre MSC or visitor location register VLR registers the new subscriber in the visitor location register. The visitor location register VLR sends the application server 9 information regarding the new foreign subscriber, arrow 2. The visitor location register VLR has decided that the subscriber is a foreigner by reading the identity code or subscriber number of the mobile station.

Using a suitable protocol, the application server 9 sends to the short-message service centre SMSC, arrow 3, a message to be sent to the foreign subscriber. The short-message service centre SMSC sends an inquiry to the home location register HLR of the foreign subscriber's home network to obtain location data for the subscriber in accordance with the normal operation of the mobile telephone network and delivers the short message given by the application server 9 to the mobile subscriber MS, arrows 4, 5 and 6.

After sending the short message to the mobile station, the mobile services switching centre MSC sends the short-message service centre SMSC, arrow 7, information indicating successful transmission, whereupon the short-message service centre transmits the information to the application server 9 using a suitable protocol. The application server 9 saves the information received in a subscriber database 10 and at the same time makes a setting that prevents the transmission of new short messages during a predetermined

period of time. Thus, if the mobile station MS is again registered in the visitor location register, no short message will be sent to it. Also, based on the information regarding successful transmission, the application server 9 can send a new complementing short message e.g. after 24 h.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims.

CLAIMS

1. Procedure for sending a short message to a mobile subscriber on the basis of the location of the mobile station, in which procedure the location of the mobile station is monitored on the basis of the data in the visitor location register (VLR), characterised in that, when it is detected that the mobile station is moving into a specified area, a short message is sent to the mobile station to give information to the mobile subscriber.

2. Procedure as defined in claim 1, characterised in that registration of foreign subscribers in the visitor location register is monitored on the basis of the identity (IMSI) and/or subscriber number (MSISDN) of the mobile station and information regarding the new foreign subscriber is sent to an application server, which sends the short message to the new foreign subscriber.

3. Procedure as defined in claim 1 or 2, characterised in that a notice indicating successful transmission of the short message is sent to the application server.

4. Procedure as defined in any one of the preceding claims 1 - 3, characterised in that information about short messages transmitted is stored in the application server and the transmission of new short messages is prevented during a predetermined period of time.

5. Procedure as defined in any one of the preceding claims 1 - 4, characterised in that the registering of foreign mobile stations in the visitor location register is monitored and, if it is detected that a mobile station has not been registered during the predetermined period of time, then the setting preventing transmission of new short messages to the mobile station in question is removed from the application server.

6. Procedure as defined in any one of the preceding claims 1 - 5, characterised in that after the first short message, a second short message is sent to complement the information contained in the first short message.

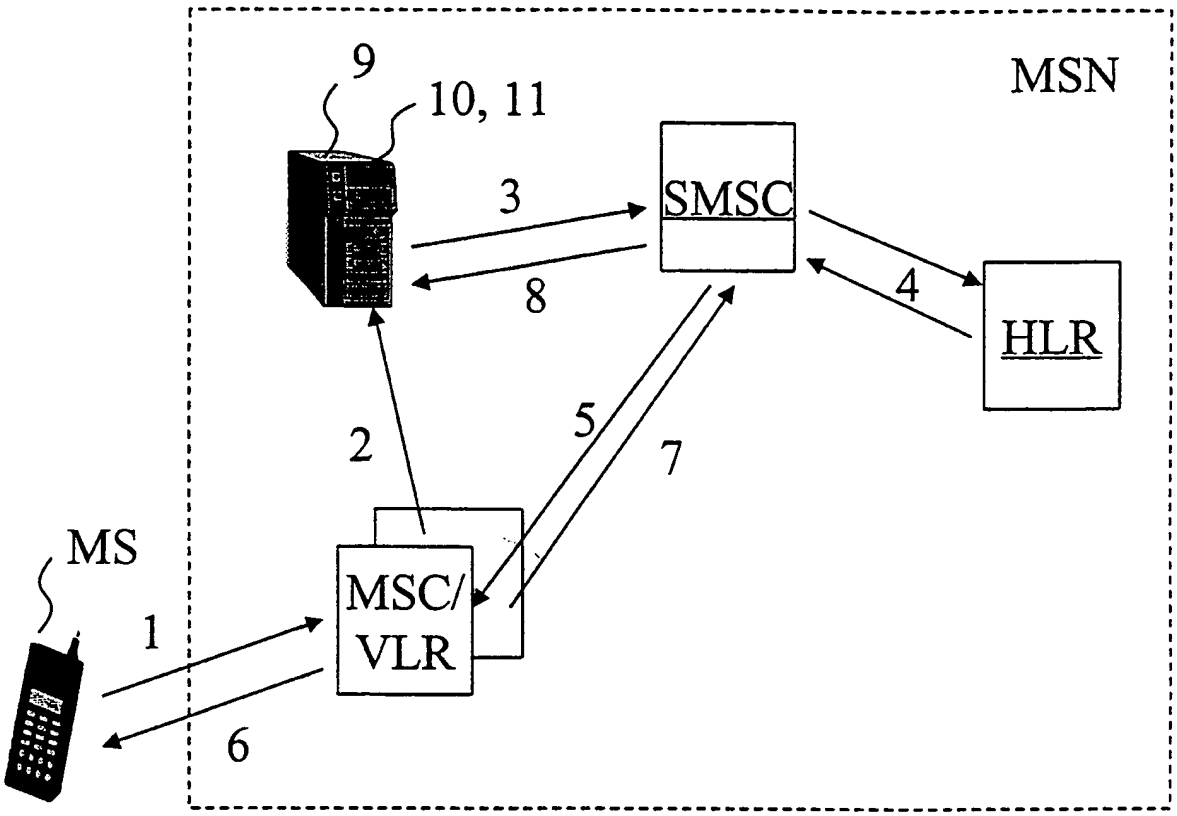
7. Procedure as defined in any one of the preceding claims 1 - 6, characterised in that the first short message is sent when the mobile station is registered in its home network.

8. Procedure as defined in any one of the preceding claims 1 - 7, characterised in that the information contained in the short message is generated on the basis of mobile station identity data.

9. System for sending a short message to a mobile subscriber on the basis of the location of the mobile station in a mobile communication network (MSN) comprising a visitor location register (VLR) and a short-message service centre (SMSC), characterised in that the system comprises an application server (9) which is connected to the mobile communication network for the purpose of monitoring the registration of mobile stations in the visitor location register and sending short messages when predetermined conditions are fulfilled.

10. System as defined in claim 9, characterised in that the application server (9) comprises means (10) for the storage of subscriber-specific information.

11. System as defined in claim 9 or 10, characterised in that the application server comprises means (11) for controlling the number of repetitions of short messages and their repetition intervals.


9
10, 11
MSN
3
SMSC
8
4
HLR
2
5
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MS
MSC/
VLR
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6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 99/00207

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/22
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9741654 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 6 November 1997 (06.11.97), page 2, line 8 - page 3, line 25; page 4, line 6 - line 29; page 5, line 11 - line 22, page 8, line 20 - page 10, line 5	1-11
Y	WO 9405124 A1 (NOKIA TELECOMMUNICATIONS OY), 3 March 1994 (03.03.94), page 2, line 1 - line 33; page 8, line 21 - page 9, line 31	1-11

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